CLAIMS

We claim:

1. (Previously Presented) A dynamic polymer-based coating, comprising:

at least one patterned polymeric layer including a plurality of discrete features electrically isolated from one another for attachment to a surface, said polymeric layer including at least one electrochemically oxidizable and reducible and electrically conductive polymer (EORECP), said EORECP having at least a partially conjugated polymer backbone and providing a room temperature electrical conductivity of between 0.1 S/cm and 1,000 S/cm, and

an electrode layer in electrical contact with said EORECP.

2. (Previously Presented) The coating of claim 1, wherein said polymeric layer substantially expands or contracts in at least one direction upon at least one of oxidation and reduction.

3. (Currently Amended) The coating of claim 1, wherein said ~~said~~ plurality of features comprise microscale or nanoscale features.

4. (Previously Presented) The coating of claim 3, wherein said plurality of features provide a roughness factor (R) of at least 2, R being defined as the ratio of actual surface area (Ract) to the geometric surface area (Rgeo); R = Ract/Rgeo.

5. (Original) The coating of claim 4, wherein said roughness factor is at least 8.

6. (Original) The coating of claim 4, wherein a spacing between adjacent ones of at least a portion of said plurality of features is less than 2 μm.

7. (Previously Presented) The coating of claim 1, wherein said polymeric layer is a polymer composite, said composite including at least one non-electrically conducting polymer mixed with said EORECP.

8. (Original) The coating of claim 7, wherein said non-electrically conducting polymer comprises at least one selected from the group consisting of elastomers, rubbers, polyurethanes, polyimides, polyamides and polysulfones.

9. (Previously Presented) The coating of claim 1, wherein said EORECP comprises at least one selected from the group consisting of polypyrrole, poly(p-phenylene) and polythiophene, and derivatives thereof.

10. (Previously Presented) The coating of claim 1, wherein said electrode layer comprises a metal.

11. (Original) The coating of claim 10, wherein said electrode layer is patterned, said pattern comprising a plurality of microscale or nanoscale features.

12. (Original) The coating of claim 11, wherein said pattern is interdigitated.

13. (Original) The coating of claim 1, further comprising a capping layer disposed on said patterned polymeric layer.

14. (Original) The coating of claim 13, wherein said capping layer comprises a flexible polymer, said flexible polymer selected from the group consisting of silicones, polyurethanes, and polyimides.

15. (Original) The coating of claim 13, further comprising a solid polymer electrolyte disposed between said plurality of features of said patterned polymeric layer.

16. (Previously Presented) A non-toxic biofouling preventative system, comprising:

a polymer-based coating disposed on a solid surface, said coating comprising a polymeric layer, said polymeric layer including at least one electrochemically oxidizable and reducible and electrically conductive polymer (EORECP), said EORECP having at least a partially conjugated polymer backbone and providing a room temperature electrical conductivity of between 0.1 S/cm and 1,000 S/cm,

an electrochemically active counter electrode spaced apart from said coating;

an aqueous solution including an electrolyte in contact with said coating and said counter electrode, and

a power supply for supplying a dynamic electrical signal to said polymeric layer, relative said counter electrode sufficient for oxidization or reduction of said EORECP.

17. (Previously Presented) The system of claim 16, wherein said polymeric layer substantially expands or contracts in at least one dimension upon at least one of said oxidation and reduction.

18. (Currently Amended) The system of claim 16, wherein said [[subsurface]] solid surface comprises a metal, wherein one terminal of said power supply is electrically connected to said [[subsurface]] solid surface.

19. (Previously Presented) The system of claim 16, wherein said polymeric layer is a patterned polymer layer including a plurality of discrete features electrically isolated from one another.

20. (Previously Presented) The system of claim 19, where said patterned polymeric layer comprises a plurality of microscale or nanoscale features.

21. (Previously Presented) The system of claim 20, wherein said plurality of features provide a roughness factor (R) of at least 2, R being defined as the ratio of actual surface area (Ract) to the geometric surface area (Rgeo); R = Ract/Rgeo.

22. (Original) The system of claim 21, wherein said roughness factor is at least 8.

23. (Original) The system of claim 21, wherein a spacing between adjacent ones of said plurality of features is less than 2 μm.

24. (Original) The system of claim 16, wherein said polymeric layer includes at least one non-electrically conductive polymer mixed with said electrically conducting polymer.

25. (Previously Presented) The system of claim 19, further comprising a patterned electrode layer in electrical contact with said polymeric layer, wherein said electrode pattern is interdigitated.

26. (Canceled)

27. (Canceled)

28. (Previously Presented) The system of claim 16, wherein said solid surface comprises a subsurface of a boat or ship.

29. (Currently Amended) The system of claim 16, wherein said [[subsurface]] solid surface comprises a metal or metal alloy, said metal or metal alloy [[subsurface]] solid surface providing said counter electrode.